ONTARIO MEDICAL ASSOCIATION.

Report of the Committee on Ophthalmology,

1882.

TORONTO:
DUDLEY & BURNS, COLBORNE STREET,
1882.

REPORT ON OPHTHALMOLOGY.*

BY A. M. ROSEBRUGH, M. D. TORONTO.

Chairman of Committee.

The ophthalmoscope was invented in 1851. Von Græfé commenced his brilliant career the same year, or the year previous. In 1854 Von Græfé and Donders established the "Archives für Ophthalmologie," and in 1860 Prof. Donders published his great work on "Accommodation and Refraction." About the same time Snellen constructed his "Test Types." In 1865 Von Græfé discovered that iridectomy will relieve intraocular pressure in glaucoma; and in 1867 he gave the world the modern operation for hard cataract. The invention of the ophthalmoscope, then, may be said to mark the commencement of a new era in ophthalmic medicine and surgery. We will not pause even to enumerate the pathological con-

---

*Read before the Ontario Medical Association, June, 1882.

ditions that may be observed with the eye mirror. We may say in general terms, however, that, with the exception of the ciliary processes, and a narrow zone of the anterior expanse of the retina, all the structures of the inner eye, with the aid of the ophthalmoscope, are brought under the eye of the observer. Except in a few cases where the disease has no ocular expression, the ophthalmoscope enables us to find a cause for all forms of blindness formerly called amaurosis and amblyopia. The ophthalmoscope is also a valuable aid in diagnosing diseases of nervous centres, as, for instance, coarse disease of the brain; and quite recently the ophthalmoscope has been recommended as a means of diagnosing diseases of the inner ear.

The treatise of Prof. Donders, of Utrecht on the optical defects of the eye, which appeared in Holland in 1860, and which was afterwards translated and published by the New Sydenham Society, is still a standard text-book. In the choice of spectacles, Donders' great work is the foundation of our therapeutics. Donders was enabled to eliminate the variable from the fixed refraction of the eye, and discovered, *first*, that presbyopia is not a refractive error, but is simply a gradual lessening

of the focal adjusting power, or accomodation of the eye, and usually commences as early as at the age of 15 years; secondly, that in the original structure of the globe, the antero-posterior diameter of the eye may be elongated or shortened, causing (practically) excessive or deficient refraction, and called respectively myopia and hyperopia; thirdly that the refraction of the different meridians of the eye may be unequal. Thus, in the vertical meridian, for instance, the refraction may be normal, while the horizontal meridian may be either myopic or hyperopic, and that this condition called astigmatism, may be simple, or it may be complicated with myopia or hyperopia. For paralyzing the accommodation, Donders dropped into the conjunctival sac a few drops of a solution of atropine, 4 grs. to the ounce. He also demonstrated that errors of refraction are factors in the causation of strabismus, —that fully 75 per cent. of cases of convergent strabismus are caused by hyperopia, that a large number of cases of divergent strabismus are due to myopia, and that the developement of the strabismus may be arrested by the early correction of the optical defect by the use of suitable spectacles, and also that after a tenotomy has been performed

the wearing of the spectacles is often necessary to prevent a relapse of the deformity. More recently, it has been satisfactorily demonstrated that the irritation arising from uncorrected errors of refraction may cause various eye troubles, such as phlyctenular inflammation of the cornea, or conjunctiva, blepharitis marginalis, neuro-retinal congestion, &c.

Ophthalmology has been wonderfully advanced by the adoption of Standard Test Types. The average acuteness of vision in the visual line—that is, at the *fovea centralis retinæ* is taken as $\frac{1}{60}$ of a degree. Capital letters, varying in size from $\frac{1}{4}$ to 4 inches in length, printed on a large card are so constructed that the diameter of the perpendicular stroke of each series of letters shall subtend an angle equal to $\frac{1}{60}$ of a degree, when viewed from a fixed distance designated: thus, No. 15 should be seen distinctly at 15 feet, No. 20 at 20 feet, No. 100 at 100 feet, and so on. When a patient can distinguish, say No. 20 at 20 feet, his vision is considered normal, and it is indicated by the fraction $\frac{20}{20}$, or unity. If, however, he can only distinguish No. 10 at 200 feet, his vision would be expressed by the fraction $\frac{20}{100}$ $(=\frac{1}{5})$ — that is, the distance at

which the letters are actually seen divided by the distance at which the letters might be seen with normal vision gives the fraction of acuity of vision. In modern ophthalmology, in addition to making a careful record of the acuteness of vision in the visual line, note is also made of the field of vision. This may be clouded or completely obliterated in certain directions, and may be caused by detachment of the retina, hæmorrhagic effusions, tumours, &c. Before giving a favourable prognosis in cataract cases, the extent of the visual field is carefully examined. In certain cases colour tests are also used, as it has of late been demonstrated that colour blindness may be an acquired lesion. In tobacco amaurosis, for instance, a seaman or a railroad man may be able to attend to his ordinary duties, but fail to distinguish between a red and a green signal. Hence such persons should be examined periodically for colour blindness.

We are indebted to Von Græfé for the modern treatment of glaucoma. He had noted the fact that iridectomy reduces the normal tension of the eye. When, therefore, it was snbsequently discovered, by the combined aid of the ophthalmos-

cope and pathological examination, that glaucoma is caused by excessive intraocular pressure, Von Græfé immediately tried the effect of iridectomy in relieving the intraocular pressure, and gave to the world a cure for an hitherto incurable disease.

During the last 15 or 20 years, a complete revolution has taken place in the treatment of cataract. By the combined use of the ophthalmoscope and oblique illumination, the different varieties of cataract can be differentiated, and the state of the development of the opacity accurately ascertained. With facilities for making an accurate diagnosis, improved operative procedures, and with the judicious adaption of the operation in each case, the results of treatment are at least as satisfactory as in any other class of surgical cases. Statistics have been collected of 11,000 cases of hard cataract treated by the old "flap" operation previous to 1868; and of 11,000 cases treated by the modern operation,—showing that with the former there was a total loss of sight in 16.7 per cent. of the cases, and with the latter operation the total loss was 6.5 per cent.; still further that of 1,000 cases of hard cataract operated upon by Von Græfé between 1865 and 1869, the total loss

was less than 3 per cent. In the modern operation, for which we are indebted to Von Græfé, the triangular Beer's Knife and the semicircular corneal flap are discarded, and a narrow knife and a straighter and more peripheral cut substituted. The cut is made more nearly in the direction of a great circle of the globe, and a sector of the iris is removed, so as to facilitate the extrusion of the lens, and prevent prolapse of the iris. This operation of Von Græfé—called the "modified linear" —is considered the classic operation for the extraction of hard cataract, but it is more or less modified according to the individual preference of the operator. Some, like Dr. Wecker, make the flap wholly in the sclero-corneal margin, make a very small iridectomy and divide the capsule only at the periphery, or even remove the lens and capsule entire. Dr. Coleman, of St. John, N.B., makes an iridectomy two or three weeks before the extraction, and subsequently divides the capsule with the corneal knife simultaneously with making the corneal section. It is, prehaps, almost unnecessary to state, that the old operation of "couching," or pushing the lens back into the vitreous, has been completely abandoned, as it was found

that fully 50 per cent. of the cases thus treated were ultimately lost from destructive inflammation.

The treatment of strabismus and paralysis of ocular muscles in late years has been modified and improved. By the operation called "layering forward," the insertion of a weakened muscle is advanced nearer the cornea. Tenotomy of a contracted muscle is performed subconjunctivally. A conjunctival suture is used to modify the effect of an operation, and prismatic spectacles are used to relieve diplopia and muscular strain. In treating paresis of ocular muscles it is now recommended to perform an early tenotomy of the secondarily contracted antagonist before applying electricity to the paretic muscle.

With the modern improved methods of preparing tissue for the microscope, there has been an advance in our knowledge of the normal and pathological histology of the eye, but we cannot stop to particularize. Quite recently the extraordinary discovery has been made that in the living retina there is secreted a photo-chemical matter, called "visual purple," which is bleached in a bright light, and re-secreted in the dark. It is said to be an albuminoid secretion, confined to the layer of

rods, and is believed to be a conservative element which enables the eye, in conjunction with the iris, to adapt itself to variations in the intensity of the light.

An advance has been made in our knowledge of the etiology of glaucoma. The prominent symptom in glaucoma is excessive intraocular tension. The eye is hard and unyielding. Until recently, this condition was supposed to depend upon hypersecretion of the choroid. It is now known that this is not necessarily the case, and that the loss of equilibrium of intraocular pressure may be caused by any interference with exosmosis or fi tration from the eye, that pressure from the peripheral part of the iris against Fontana's spaces and Schlemm's canal—at the so-called "iritic angle,"—causes glaucoma, not from any increase in the secretion from iris or choroid, it is claimed, but by mechanically interfering with exosmosis or filtration through the trabeculæ of the anterior scleral ring. Iridectomy, or the removal of about $\frac{1}{5}$ of the iris, was supposed to relieve the intraocular pressure by removing a large secreting surface, but its action is now believed to depend partly upon the removal of pressure at the iritic angle, and partly upon filtra-

tion being favoured by the cicatrix, in the anterior scleral ring.

The construction of the ophthalmoscope has been greatly improved of late years. The form now in gene al use is Knapp's and Loring's. A disc is secured behind the mirror which can be rotated, and which carries a series of very small convex and concave lenses behind the central aperture of the mirror. By this convenient arrangement any optical defect either in the eye of the observer, or in the eye under observation, is counterbalanced. By suspending the accommodation and rotating the lenses behind the mirror, the latter being brought close to the eye under observation, the refraction can be, at least approximately determined, and by this method alone it is possible to prescribe the proper correcting spectacles; but this method of examination is rather resorted to for the purpose of confirming the result of the examination made with the test types and trial glasses,—with or without paralyzing the accommodation.

Among the operative procedures which may be said to be on trial may be mentioned optico-ciliary neurotomy as a substitute for enucleation; sclerotomy as a substitute for iridectomy in certain

forms of glaucoma, and Loring's discission of the iris for closed pupil after cataract operation as a substitute for Dr. Wecker's scissors-operation (iritomy).

Eserine is being substituted for atropine in connection with cataract operations, and in the after treatment of extraction, the eye is now less interfered with than formerly. If there is no œdema of, or discharge from between the eyelids, it is now advised to keep the eye closed for about seven days after the operation. For the removal of chips of iron or steel from the interior of the eye, the permanent magnet is giving place to the more powerful electro-magnet.

Antisepsis, which has proved a boon in general surgery, has been tried in ophthalmic surgery, but not with encourging results; and, moreover, the practical difficulties in the way of carrying out strictly antiseptic treatment in ordinary eye operations, seem to be almost insurmountable. The eye is, however, sponged with antiseptic solutions before and after important operations, all instruments before use are made absolutely clean, or even dipped in an antiseptic solution, and caution is used to prevent the infection of wounds from blenorrhœa

of the lachrymal sac, the discharges from trachoma, &c., and where atropine or eserine is used continuously for some time, it is considered advisable that these salts (which, by-the-way, should be quite neutral) should be dissolved in a two or three per cent. solution of boracic acid. Boracic acid solution are also used in cases where there is purulent discharge, and boracic acid in powder has recently been used, and apparently with good effect, in cases of purulent conjunctivitis.

Among the new remedies recently introduced into ophthalmic practice, duboisia and homatropine dilate the pupil, while eserine and pilocarpine concontract it. Duboisia can be substituted for atropine in the exceptional cases where the latter is found to irritate the conjunctiva. Atropine is the most reliable for dilating the pupil in plastic iritis. It also acts as an anodyne to the sensitive nerves of the iris and cornea. But it is contra-indicated where there is a tendency to glaucomatous complications, or in serous iritis, on account of its tendency to increase intraocular tension ; in the latter case, homatropine is substituted for the atropine. In cases where it is simply desirable to dilate the pupil temporarily, as, for instance, for an ophthal-

moscopic examination, homatropine, used in a weak solution, will dilate the pupil without paralyzing the accommodation,and its effect upon the pupil is more transitory than that of atropine. Used in stronger solutions, say 5 or 6 grains to the ounce, homatropine will paralyze the accomodation, and the paralysis is not nearly so persistent as it is after using atropine solutions. This is an advantage in favour of homatropine in treating anomalies of refraction. Eserine is used both for contracting the pupil and relieving intraocular tension. It is a valuable adjunct in the treatment of glaucoma, and in some cases may alone ward of an inflammatory attack. By relieving intraocular pressure, it is a valuable remedy in suppurative and ulcerative diseases of the cornea. Pilocarpine is not so powerful a myotic as eserine, and is not so much used as a local application. Used hypodermically, however, in $\frac{1}{4}$ or $\frac{1}{3}$ grain doses, it acts beneficially upon scleral and episcleral disease, and is recommended for sub-retinal effusion and opacities of the vitreous.

In cases of complete paunus of both cornæ and as a last resort, purulent inflammation is artificially induced by inoculation with blenorrhœal matter,

preferably from a case of benign ophthalmia neonatorum. Good results are obtained in many cases but the procedure is not a perfectly safe one, and it is moreover very difficult to obtain the matter from a healthy patient. It is now proposed to use an infusion of the seeds of Jequerity obtained from Brazil, where it is used for exciting purulent inflammation in cases of trachoma or true granular conjunctivitis. In using Jequerity the degree of inflammation produced, it is claimed, is more under the control of the surgeon.

Electricity is used with advantage in ophthalmic practice. The faradic current is used in hysterical amblyopia, in muscular asthenopia and muscular paresis, in photophobia and twitching of the eyelids and for promoting absorption of opacities of the vitreous. The galvanic current is used for paresis of occular muscles, phlyctenular and ulcerative keratitis and in incipient atrophy of the optic nerve, retina and choroid, as well as in chronic retinitis and choroiditis. Electricity is also used to relieve neuralgic pains in and around the orbit.

Pagenstecher thinks massage occupies a very important place in ocular therapeutics. He uses either circular or radial friction of the eye with the

finger against the closed lid, making very light and rapid motion. It is recommended in old corneal opacities, in pustular conjunctivitis, in scleritis and episcleritis. Pagenstecher prefers combining the massage with the use of oxide of mercury ointment, but claims very satisfactory results from the massage alone.

The interest now taken in ophthalmology is quite remarkable. An International Ophthalmological Association, which meets every four years, was established about twelve years ago, and many vigorous local societies are now in operation. The American Ophthalmological Society numbers over 75 active members, and quite a large volume of transactions is published annually. There are now over one dozen journals devoted either exclusively or very specially to the advancement of this department of medical science. But, as we sometimes say, "It never rains but it pours." During the past 12 months four treatises on diseases of the eye were issued by the American press alone—one written by Dr. Noyes, of New York, one by Dr. Williams, of Boston, one by Dr. Schell, of Philadelphia, and one by Dr. Mittendorf, of New York.